

The Invention

This invention relates to a process for inhibiting corrosion. The amended claims define the process, so that the particular use and advantages of the process are highlighted. The process is carried out by adding a corrosion inhibiting composition comprising (a) an aliphatic amine, (b) an azole selected from the group consisting of (1) tolyltriazole, (2) benzotriazole, and (3) mixtures thereof, and a benzoate to an aqueous system. The compositions are useful in inhibiting the corrosion of drained metal equipment that contain recesses where water resides after drainage, e.g. engine blocks that have been tested for leaks before they are stored, shipped, and distributed. The water in the recesses evaporates after the equipment had been flushed with water and can cause vapor phase corrosion.

As the amended claims imply, the corrosion inhibiting compositions used in the process do not require inorganic salts such as phosphates for them to be effective, although they may be used in minor amounts. The absence of inorganic salts minimizes the occurrence of dry residues that can form in the equipment that has been drained.

DISCUSSION OF EXAMINER'S OFFICE ACTION

Election/Restrictions

The Examiner required restriction to one of the following inventions:

- I. Claims 1-6, drawn to a corrosion inhibiting composition, classified in class 252, subclass 390.
- II. Claims 7-11, drawn to a process for inhibiting corrosion of metal equipment, classified in class 422, subclass 9.

Applicants' response

Applicant confirms that claims 7-11 were elected and withdraws their traverse to the restriction requirement. Claims 1-6 were withdrawn.

Claim Objections

Claims 7-11 are objected to because they are dependent on non-elected base claims 1-6. Appropriate correction is required.

Applicants' response

The claims were amended to correct this defect.

Claim Rejections - 35 USC § 112, second paragraph

The following is a quotation of the second paragraph of 35 U.S.C. §112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the Applicants regards as their invention.

Claims 8-11 are indefinite because claim 8 recites the limitation "the aqueous system". There is insufficient antecedent basis for this limitation in claim 7 from which claim 8 directly depends. Claims 9-11 are also being rejected here because they are dependent on a rejected base claim.

Applicants' response

Claims were re-worded and Applicants believe this objection is no longer warranted.

Claim Rejections - 35 USC § 103 (a)

The following is a quotation of 35 U.S.C. §103(a), which forms the basis for all obviousness rejections Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Legal Standard of Obviousness

Graham V. John Deere, 383 U.S. 1, 148 U.S.P.Q. 459 (1966) outlined the approach that must be taken when determining whether an invention is obvious. In *Graham*, the Court stated that a patent may not be obtained if the subject matter would have been obvious at the time the invention was made to a person having ordinary skill in the art, but emphasized that nonobviousness must be determined in the light of inquiry, not quality. Approached in this light, §103 permits, when followed realistically, a more practical test of patentability. In accordance with *Graham*, three inquiries must be made in determining whether an invention is obvious:

- (1) The scope and content of the prior art are to be determined.

- (2) The differences between the prior art and the claims at issue are to be ascertained.
- (3) The level of ordinary skill in the pertinent art resolved.

Against this background, the obviousness or nonobviousness of the subject matter is determined. Secondary considerations, such as commercial success, long felt but unsolved needs, failure of others, etc., can be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

In conjunction with the interpreting 35 U.S.C. §103 under *Graham*, the initial burden is on the Examiner to provide some suggestion of the desirability of doing what the inventor did, i.e. the Examiner must establish a *prima facie* case of obviousness. To support the conclusion that the claimed invention is directed to obvious subject matter, either the references must expressly or impliedly suggest the claimed invention, or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references.

To establish a *prima facie* case of obviousness, three basic criteria must be met:

1. There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.
2. There must be a reasonable expectation of success.
3. The prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on Applicants' disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q. 2d 1438 (Fed. Cir. 1991). See MPEP § 2143 - § 2143.03 for decisions pertinent to each of these criteria.

The discussion in *In re Kotzab*, 55 U.S.P.Q. 2d 1313 (Fed. Cir. 2000) at page 1317 is also relevant wherein the Court stated:

A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. See *Dembiczak*, 175 F.3d at 999, 50 USPQ2d at 1617. Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher."¹ *Id.* (quoting *W.L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303,313 (Fed. Cir. 1983).

Most if not all inventions arise from a combination of old elements. See *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998). Thus, every element of a claimed invention may often be found in the prior art. See *id.* However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. See *id.* Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the APP. See *In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998); *In re Gordon*, 733 F.2d 900,902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference. See *B.F. Goodrich Co. v. Aircraft Breaking Sys. Corp.*, 72 F.3d 1577, 1582, 37 U.S.P.Q. 2d 1314, 1318 (Fed. Cir. 1996).

The motivation, suggestion or teaching may come explicitly from statements in the prior art, the knowledge of one of ordinary skill in the art, or, in some cases the nature of the problem to be solved. See *Dembiczak*,

¹ Underlining added for emphasis.

175 F.3d at 999, 50 USPQ2d at 1617. In addition, the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. See *WMS Gaming, Inc. v. International Game Tech*, 184 Fed 1339, 1355, 51 U.S.P.Q. 2d 1385, 1397 (Fed. Cir. 1999). The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981) (and cases cited therein). Whether the Board relies on an express or an implicit showing, it must provide particular findings related thereto. See *Dembicrak*, 175 Fed at 999, 50 USPQ2d at 1617. Broad conclusory statements standing alone are not "evidence". *Id.*

The person of ordinary skill in the art (TPOSA)

Determining the level of ordinary skill in the art is often the most difficult of the *Graham* inquiry in an *ex parte* proceeding. In an *ex parte* proceeding, the Examiner and Applicants typically do not have testimony or survey evidence on this issue. They must rely on the experience of the Examiner and Applicants to resolve this issue.

For this invention, Applicants submit that the relevant art relates to corrosion inhibitors for aqueous systems. It is assumed that TPOSA working in this field typically had a degree in chemistry or at least a working knowledge of the basic chemistry in the water treatment industry. Applicants assume that TPOSA was aware of the references cited by the Examiner.

Applicants believe these are the circumstances that were influencing TPOSA at the time Applicants made their invention. This information, practical knowledge, and costs influenced TPOSA in solving problems. The water treatment industry was a mature industry and the field was very crowded. Based upon their experience in the art, Applicants submit that technological improvements in this field were gradual and only incremental.

Claims 7-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manaba et al. U.S. Patent Number 4,219,433 or Peters et al. U.S. Patent Number 4,404,113 or Mulvihill et al. U.S. Patent Number 5,415,896 or Haas et al. U.S. Patent number 6,464,899 or Miksic et al. U.S. Patent number 5,855,975 or Miksic et al. U.S. Patent Number 5,422,187.

Manabe et al discloses corrosion inhibiting anti-freeze compositions useful for automobile engines. The corrosion inhibitors used in the corrosion inhibiting anti-freeze compositions can be selected from benzoate, trialkanolamine, benzotriazole, tolyltriazole, and other types of corrosion inhibitors etc, and mixtures thereof, see abstract, column 2, line 59 to column 3, line 15, column 3, lines 41-53, column 4, lines 8-19 and Examples 1-2.

Peters et al discloses cooling liquids containing corrosion inhibitors that are used in internal combustion engines. The corrosion inhibitors used in the cooling liquid compositions can be selected from alkali metal benzoate, alkanolamine, benzotriazole, tolyltriazole, and other types of corrosion inhibitors etc, and mixtures thereof, abstract, column 2, lines 32-65, column 3, line 50 to column 4, line 6, examples and claims.

Mulvihill et al discloses railroad wheel flange lubrication compositions that comprise corrosion inhibitors. The corrosion inhibitors used in the lubricating compositions can be selected from sodium benzoate, alkanolamine, benzotriazole, tolyltriazole, and other types of corrosion inhibitors etc, and mixtures thereof, see abstract, column 2, lines 33-47, examples and claims.

Haas et al discloses putty compositions containing vapor phase corrosion inhibitors. The corrosion inhibitors used in the putty compositions can be selected from sodium benzoate, ammonium benzoate, trialkanolamine, benzotriazole, and other types of corrosion inhibitors etc, and mixtures thereof, column 5, line 31 or column 6, line 27, column 7, lines 1-5, Example 7 and the claims.

Miksic et al discloses anti-corrosion plastic films that contain vapor phase corrosion inhibitors. Preferred corrosion

inhibitors used in the anti-corrosion plastic films can be selected from cyclohexylamine benzoate, ethylamine benzoate, dicyclohexylamine nitrate, benzotriazole, and other types of corrosion inhibitors etc, and mixtures thereof, see abstract, Example V and the examples VI-VIII.

Miksic et al discloses vapor phase corrosion inhibitors-desiccant material for inhibiting corrosion on a metal surface. The corrosion inhibitors used in the composite compositions can be selected from benzoate, trialkanolamine, benzotriazole, and other types of corrosion inhibitors etc, and mixtures thereof, see abstract, column 7, lines 33-63, examples and claims.

All the above said patents differ from applicant's claimed invention in that they do not directly teach (i.e. by way of an example) a corrosion inhibiting composition that actually comprises applicant's components (a), (b) and (c) within applicant's claimed concentration weight ratios. It would have been obvious to one having ordinary skill in the art to use the individual disclosures of each applied patent as strong motivation to make corrosion inhibiting compositions that actually comprise applicant's claimed components (a), (b) and (c) within applicant's claimed weight ratios since such weight ratios extensively overlap the suggested weight concentration ranges of applicant's components (a), (b) and (c) as set forth in the cited sections of each patent. The use of mixtures of corrosion inhibitors, such as applicant's claimed mixtures of (a), (b), and (c), is either directly taught (i.e. by the examples) of each patent or are strongly suggested by the disclosure of each patent in said cited patent section as list above.

Applicants' response

Manabe relates to a metal corrosion inhibitor comprising per 100 parts by weight of (a) benzoic acid and/or a benzoate, 30 to 160 part by weight of (b) a trialkanolamine, 3.8 to 120 parts by weight of (c) phosphoric acid and/or a phosphate², and 1 to 20 parts by weight of (d) at least one selected from mercaptobenzothiazole, its salts, benzotriazole and tolyltriazole, the amount of said benzoate, phosphate and salts of mercaptobenzothiazole being calculated as benzoic acid, phosphoric acid and mercaptobenzothiazole, respectively. The corrosion inhibitors are used in antifreezes for internal combustion engines.

The problem solved by Applicants' process is not identified in Manabe. Applicants process is concerned with preventing vapor phase corrosion that is caused by water contained in recesses of equipment that has been drained, e.g. equipment that has been tested for leaks before storage, shipping, and distribution. Furthermore, the corrosion inhibiting composition used in Applicants' process contains less than 1.0 part of inorganic salt, e.g. phosphate, preferably 0 part, and Manabe requires a phosphate and/or phosphoric acid. In fact, the addition of an inorganic salt to Applicants' corrosion inhibiting composition detracts from its performance, because the inorganic salt can form deposits in the recesses of the equipment being treated by the process. Since the problem solved by Applicants is not identified by Manabe, the compositions used by Applicants are different, and, in fact, the compositions disclosed by Manabe would be

² Underlining added for emphasis.

detrimental if used in Applicants' process, Applicants submit that their process would not have been obvious to the person of ordinary skill in the art (TPOSA) at the time their invention was made.

The question is whether Applicants process would have been obvious if the secondary references were combined with Manabe. Applicants submit that the secondary references do not suggest needed to Manabe for TPOSA to derive to derive their process. None of the secondary references identify the problem solved by Applicants' process. Furthermore, none of the references teach or suggest the particular combination of components used in the corrosion inhibitors of Applicants' process, and none of the references suggest that is advisable to minimize or eliminate inorganic salts from the corrosion inhibiting compositions used in the process.

Applicants submit that TPOSA would not have combined the secondary references with Manabe and derived Applicants' process for other reasons:

1. Peters relates to a cooling liquid with corrosion-inhibiting and cavitation-inhibiting additives. The cooling liquid contains (a) at least one polyhydric alcohol, (b) a corrosion inhibitor selected from the benzotriazoles; the alkanolamines and salts thereof; the alkali metal borates, benzoates, nitrites, nitrates, silicates, or phosphates; or mixtures of said corrosion inhibitors; and (c) certain amines containing $-SO_2$ groups. In view of the uses Peter's discloses for his compositions, the type components used, and his failure to disclose or suggest the combination of components used in the corrosion inhibitor of Applicants' process, Applicants submit that TPOSA would not have combined the secondary references with Manabe and derived Applicants' process
2. Mulvihill is less relevant than Peters. Mulvihill relates to a method of lubricating a railroad wheel flange in contact with the gage face of a rail. The method relies on an aqueous lubricating composition comprising two polyoxyalkylene glycols, one a synthetic thickener and the other a synthetic lubricating oil. The text the Examiner referred to at

column 2, lines 33-47 is very generic and clearly does not suggest the combination of components used in the corrosion inhibitor of Applicants' process.

3. The same can be said for Haas and Milksic. Haas relates to corrosion inhibiting compositions that include a putty-like base material that is pliable and has sufficient tackiness to be securely fixed to surfaces, while Milksic relates to vapor phase corrosion inhibitor-desiccant composites. Again, the referred to by the Examiner is very generic and clearly does not suggest the combination of components used in the corrosion inhibitor of Applicants' process.

Conclusion

In view of the differences between Applicants' invention and the prior art, Applicants submit that Applicants' process is not obvious. Furthermore, Applicants submit that their process could only be derived from the references by the use of "hindsight", i.e. by knowing what Applicants' invention was in advance from Applicants' disclosure, and then *ex post facto* reconstructing Applicants' invention from the prior art after a thorough search. The prior art does not lead TPOSA to Applicants' invention. In this regard, Applicants believe the discussion in *In re Kotzab*, 55 U.S.P.Q. 2d 1313 (Fed. Cir. 2000) at page 1317 is relevant:

A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field. See *Dembiczak*, 175 F.3d at 999, 50 USPQ2d at 1617. Close adherence to this methodology is especially important in cases where the very ease with which the invention can be understood may prompt one "to fall victim to the insidious effect of a hindsight syndrome wherein that which only the invention taught is used against its teacher."³ *Id.* (quoting *W.L. Gore & Assocs., Inc. v Garlock, Inc.*, 721 F.2d 1540, 1553, 220 USPQ 303,313 (Fed. Cir. 1983).

Most if not all inventions arise from a combination of old elements. See *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998). Thus, every element of a claimed invention may often be found in the prior art. See *id.* However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. See *id.* Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the APP. See *In re Dance*, 160 F.3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998); *In re Gordon*, 733 F.2d 900,902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). Even when obviousness is based on a single prior art reference, there must be a showing of a suggestion or motivation to modify the teachings of that reference.

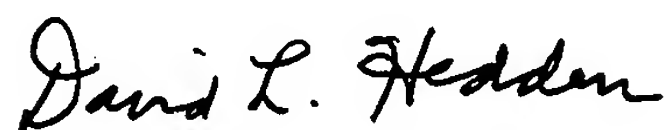
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See *B.F. Goodrich Co. v. Aircraft Breaking Sys. Corp.*, 72 F.3d 1577, 1582, 37 U.S.P.Q. 2d 1314, 1318 (Fed. Cir. 1996).

Applicants submit that there was no motivation or suggestion based on the prior art to derive their process, particularly since the problem solved by Applicants was not even identified in the prior art. Furthermore, Applicants submit that TPOSA could not have predicted the success of Applicants process, particularly because Applicants process uses a corrosion inhibiting composition that contains minimal, or preferably no inorganic salts.

Applicants submit that the application is now in condition for allowance and respectfully request a notice to this effect. If the Examiner believes further explanation of Applicants' position is needed, Applicants' attorney will discuss this matter over the telephone or visit the Examiner personally if this may be useful.

Respectfully submitted,



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